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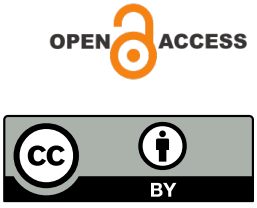

Analyzing Michael Finnissy's Second String Quartet

A Multimedia Interactive Approach

Amanda Bayley, Michael Clarke

The aim of this collaborative research is to show the potential for developing interactive strategies for music analysis. This article demonstrates how the wide range of multimedia outputs of Bayley's research into the processes of composition, rehearsal and performance of Michael Finnissy's Second String Quartet (2006/2007) can be accommodated by extending Clarke's »interactive aural« approach, using Cycling 74's Max/MSP software. The overall objective is to provide a model that can be widely used for research into the creative processes that can subsequently inform music analysis. Traditionally, analysis of Western Classical music has made reference primarily, if not exclusively, to the score, and is presented as a linear written text, illustrated by music examples and charts. The approach developed here directs the activity of music analysis away from a fixed, static text and towards an interactive, multimedia experience evolving from creative and interpretative processes which shape the aural, transient and dynamic qualities of the music. Through the integration of materials resulting from ethnographic study, the software assists the analysis of composer-performer relationships which are particularly under-researched in musicology.

This project is the result of a collaboration between two researchers from different backgrounds: musicology and computer music. The initial stages of this research, published by the present authors in the Journal of Interdisciplinary Music Studies[1], explored the interface between performative, analytical and aural approaches to musical structure in Michael Finnissy's Second String Quartet (2006/2007).[2] Drawing on Clarke's previous work developing »interactive aural analysis«[3] and Bayley's ethnographic research into the Finnissy quartet from composition to performance, the project aims to show the potential for developing interactive strategies for music analysis. There were two main aims for the research described in the article: firstly,

1 Bayley / Clarke, *Interactive Strategies*.

2 Finnissy was commissioned to write his Second String Quartet by the University of Wolverhampton and the Birmingham Conservatoire (Birmingham City University) as part of a bigger project led by Bayley in 2007–2009, in collaboration with the Kreutzer Quartet, funded by a British Academy Larger Research Grant. The rehearsal was recorded on 4 February 2007. The world premiere took place in Wolverhampton, 13 February 2007, and was recorded by David Lefeber of Metier Sound and Vision Ltd.; the London premiere, 8 March 2007, was recorded by Jonathan Haskell of Astounding Sounds. The third concert performance was filmed at the Royal Academy of Music, 23 March 2007, as part of the York Gate Research Seminar series. A fourth studio recording was made on 26 October 2008 at the Royal Academy of Music, filmed by Colin Still of Optic Nerve Ltd. and recorded by Kirsten Cowie. The rehearsal and all four performances have been integrated into the software DVD. For details and availability of all publications and recordings relating to this research see: ›http://www.wlv.ac.uk/sspal/stringquartetresearch‹.

3 For an example of interactive aural analysis see Clarke, *Jonathan Harvey's* Mortuos Plango, Vivos Voco, and for a discussion of this approach see Clarke, *An Interactive Aural Approach*.

to provide an informative, interactive tool to enable readers to navigate flexibly through the different musical perspectives of the piece; and, secondly, to show how materials gathered from ethnographic research can contribute to the presentation and analysis of musical structure. In this essay now the purpose is to present a more detailed analysis of Finnissy's Second String Quartet and to demonstrate the wide range of content that the software-based analytical method can promote. Research into creative musical processes enables connections to be made between compositional and analytical thinking. New analytical methodologies are required to accommodate discursive and reflective approaches to composition, rehearsal and performance.

Rather than following a fixed linear path, the software-based method promotes an integrated approach to analysis which relates different materials gathered from the project. It allows the composer's intentions and insights to be explored from different angles instantaneously: within the context of an overall analysis of the piece; through detailed analysis of specific sections; in the context of the dialogue between composer and performers[4]; and in the context of the composer's comments revealed during interviews. Figure 1 attempts to show something of this flexible non-linearity by schematically illustrating one possible pathway through the multimedia materials. Navigation through this rich labyrinth of materials is by means of a tree-structure (see below). The software also provides means for comparing different performances of the work.[5]

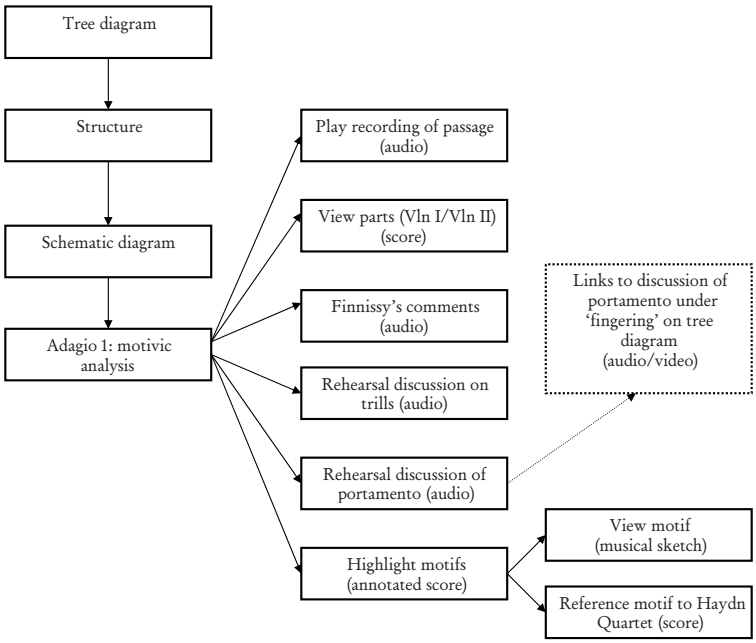

Figure 1: One possible path through the multimedia materials.

4 Members of the Kreutzer Quartet are Peter Sheppard Skærved, Mihailo Trandafilovski, Morgan Goff and Neil Heyde.

5 Cf. Bayley / Clarke, *Interactive Strategies*.

A multimedia interactive approach extends beyond conventional analytical representations of music by allowing any number of musical perspectives to be traced through their various stages of creative development; that is, from conception (interviews with the composer and his sketch materials) to the interpretative processes that take place in rehearsal and performance (composer-performer interactions). These interactions reveal a network of relationships that is represented in the form of a tree diagram (Fig. 2).[6] From left to right the materials proceed from composition to performance, with the different branches directing the user to specific topics emerging from the rehearsal. The »rehearsal« button links directly to a »schematic diagram« (Fig. 3) which can also be accessed by selecting »structure« in Figure 2.

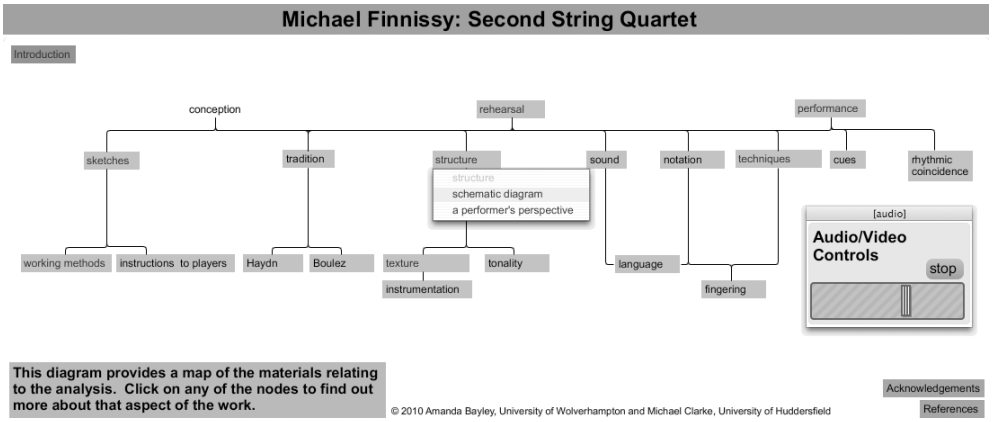

Figure 2: Tree diagram.

The »schematic diagram« gives an index of rehearsal materials and is the main point of orientation for the reader where any section of the piece can be accessed. Clicking on a particular instrument brings up the respective part in the right-hand side of the screen (Fig. 3).

Finnissy did not produce a full score because for much of the piece there is no fixed synchronization between parts. This provides an additional challenge for analyzing the piece. In order to project an analysis (and to involve the reader actively in the analytical process) at some points in the piece an alignment of parts has been constructed. Figure 4 shows how the parts have been aligned at rehearsal number 6 which is the beginning of the »minuet« section. This is one of the few sections of the piece where the parts are rhythmically synchronous. The bars appear in different lengths because they have been extracted from each individual part. In most other sections of the piece rhythmic coincidence is to be avoided and the composer felt this was:

6 Colour plays an important part in the software displays (for example different functions are coded in different colours). These are inevitably represented throughout this article only by screenshots reduced to greyscale.

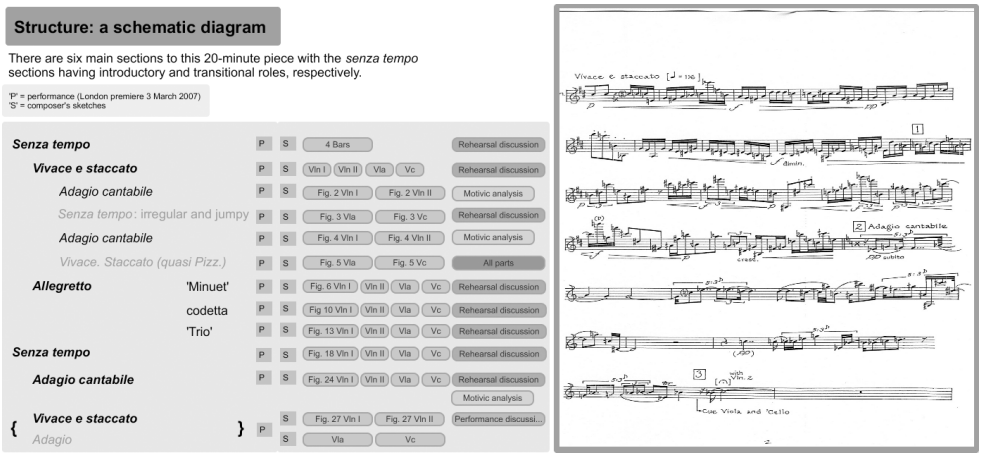

Figure 3: Schematic diagram.

easier to achieve without a score – without making a point of it... It seemed pertinent anyway because there were going to be bits of the score that wouldn't be scoreable (the bits where they divide into pairs and go their own way) so there would be those lacunae in the score where there would have to be a different format.
Something happens when you represent something as a score rather than as a set of parts, inferring that it's about individual polyphony, individual responsibility for carrying a line somewhere with a phrasing which is not referenced to barlines. Perhaps I'm wrong, perhaps that's something that comes afterwards.[7]

Finnissy's comments do not explain why he wrote out sections of the piece in score format in the sketches (Fig. 4). When questioned further on this he explained his working procedure as follows:

The reason I wrote the sketches out as score is because I wanted to see how the notes lined up. [...] It depends on the overall harmonic movement. And because this was a kind of a neoclassical experiment *á la* Haydn or whatever. It seemed that the harmony moves in faster moving blocks than I was normally used to so I wasn't confident that on its own my ear would do the job. So I had to do it that way. You can see from the layout that it's not particularly bound by the barlines. I think that it's really only to see what the textural movement is like as much as the harmonic one, that the score is at all useful.
Inevitably, as a non-string player, my knowledge of the Haydn quartets is based on what they look like in score format so part of reproducing the Haydn effect is to produce score format, too. I think there's about 35% of it which is not scoreable.[8]

Figure 4 shows how, using the software, comparisons can be made between visual and aural sources: the instrumental parts, the composer's sketch and the Minuet from Joseph Haydn's string quartet op. 64,5, are supplemented by audio examples comprising a concert performance of the »minuet« section of Finnissy's Quartet, dis-

7 In interview with Bayley (8 May 2008). This interview and some of those which follow appear in French translation in Bayley, *Enquête sur la genèse du Deuxième quatuor à cordes de Michael Finnissy*, where emphasis is placed on the ethnographic approach to this research.
8 Ibid.

cussion and playing of the »minuet« section in rehearsal, a performance of Haydn's Minuet and an interview with the composer (from which the above quotes have been transcribed).

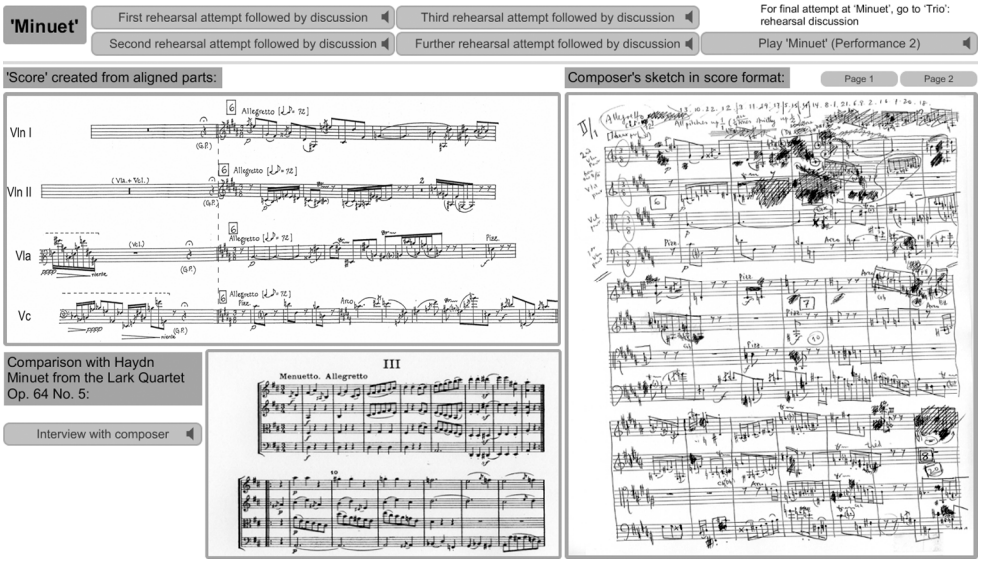

Figure 4: »Minuet« button from schematic diagram.

Interview material adds an invaluable dimension to this research: insights from the composer guide the reader, listener, performer or musicologist towards »hidden« aspects of the piece that are not apparent directly from the score or a recording. Interviews have been included in the DVD only in aural form, rather than as transcribed text, in order to provide more versatility. The audio can be listened to while moving around different instrumental parts or sections of the piece, whereas transcriptions of interviews take up precious space on the screen. There is also an expressive element conveyed in the spoken word (on video or audio recordings) that does not come across in written form – which is what gives this software a strong advantage over conventional methods of documentation and analysis. Interpreting audio and video material also gives the potential for exploring new modes of analysis, such as linguistic and discourse analysis.

Additionally, the software allows the various tensions that Finnissy sets up across different parameters within the piece to be traced so that they can contribute to the analysis. The composer's description of his working methods are particularly revealing in this respect. Having completed the Quartet, Finnissy was questioned on an earlier claim that he often worked in terms of creating assemblages (as opposed to »faking some kind of organic process«[9]). When asked if that was the approach he adopted for this piece he said:

9 In interview with Bayley (10 July 2006).

Yes and no... Just generally, I see composition as a means of bringing different things together into the same space. And I've never been a dogmatist about ideas like serialism, or diatonicism or any other »ism«, new complexity. So I like things to have their opposites in the same space... like black and white, soft, complex, simple. And in this case having stumbled across the Haydn and having made a decision to use that, of course, I wanted to work with [...] a kind of non-Haydn material too. [...] This isn't the 18th century, this is 2007 [...] and classicism if it's anything is a kind of reference point. It's a classicism which we perceive in a different way to the way Haydn would perceive it. Because of course it was new music when Haydn was writing it. [...] I didn't really want to write that kind of debate. So up to a point the piece »assembles« those things.[10]

In an earlier interview, in February 2007 immediately prior to the rehearsal, Finnissy explained in more detail how he switches between different types of material:

When you see the material, you can see which bits have one type of continuity and which bits are obviously the product of intercutting this material with another type, a bit like you can perceive visually the difference between a jump cut which just goes from this sequence to that sequence or a slow fade in which one image bleeds into another and they have a different emotional and psychological effect. I've used both types here.[11]

A jump cut from one sequence to another is evident at the start of the »minuet« section (Fig. 4): at the end of the previous Vivace section (which starts at rehearsal number 5) the players all arrive at a general pause at different times, rejoining each other at the beginning of the »minuet«. The software allows the user to refer to evidence from the rehearsal to learn more about how the players interact with each other and with the composer, and how they negotiate different sections of the piece. During the rehearsal, when questioned about a pause earlier in the movement, Finnissy explained: »At all moments where there are those pauses you just wait serenely... and that's fine.«[12] When the players turned to the »minuet«, not familiar with the other players' parts, the cellist, Neil Heyde, asked: »We're liable to have silence before the Minuet, aren't we?«, to which Finnissy responded: »[It] should feel ... like the kind of silence you have between two movements.«[13]

The audio extracts allow the user to hear how the rehearsal process works. This is particularly instructional for performers, showing the benefits to be gained from discovering, in Finnissy's words, »how performers *should* work with composers«.[14] The advantage of the audio recording of the rehearsal is that it conveys the reality of the overlapping discourse of five musicians (four performers and the composer) overflowing with pertinent ideas or questions but it does sometimes make the conversational flow difficult to interpret. The players frequently interrupt each other with comments or musical interjections relating to recent playing experiences or observations relevant to the piece. Regarding the discussion surrounding the »minuet« and its preparation, for example, Heyde soon refocusses the group with the following authoritative statement: »This is a real minuet and it's led by the first

10 In interview with Bayley (8 May 2008).
11 In interview with Bayley (4 February 2007).
12 Rehearsal 4 February 2007.
13 Ibid.
14 Finnissy made this comment to Bayley in 2008. His emphasis.

violin«, in response to which the players take up their instruments to continue from rehearsal number 6.

An important feature of the software is that it enables the user to experience first-hand such conversational and musical exchanges between the players while following either the alignment of parts as a re-constructed »score«, or the composer's score from the sketches, or the individual parts, or a combination of all three; at any point on the schematic diagram (Fig. 3) the user can listen to the second concert performance of that section without navigating away from that page.

Returning to Finnissy's compositional methods (from the interview above), an example of a slow fade, where one image bleeds into another, is evident earlier in the piece, from rehearsal number 1 into 2: at the end of a short ensemble section comprising the first Vivace the viola part dovetails the beginning of the first duo between the two violins; the individual parts at rehearsal number 2, the first Adagio section of the piece, are shown in Figure 5. This diagram is reached via the »texture« button on the tree diagram (Fig. 2) followed by the »score« button from the drop-down menu, and is a condensed version of a more detailed analysis of texture on the adjacent »analysis« button (also under »texture«; discussed below).[15] The left-hand column is colour-coded to depict textural contrasts which are aligned vertically to correspond to each instrument. When a section of the piece is selected from this column, the relevant parts are displayed, accompanied by the recording of the second concert performance of that section. However, the zoom feature also allows each part to be viewed separately. The »H« buttons on the far left bring up score pages that show textures comparable with Haydn's string quartet op. 64,5, while listening to the Kreutzer Quartet playing them.

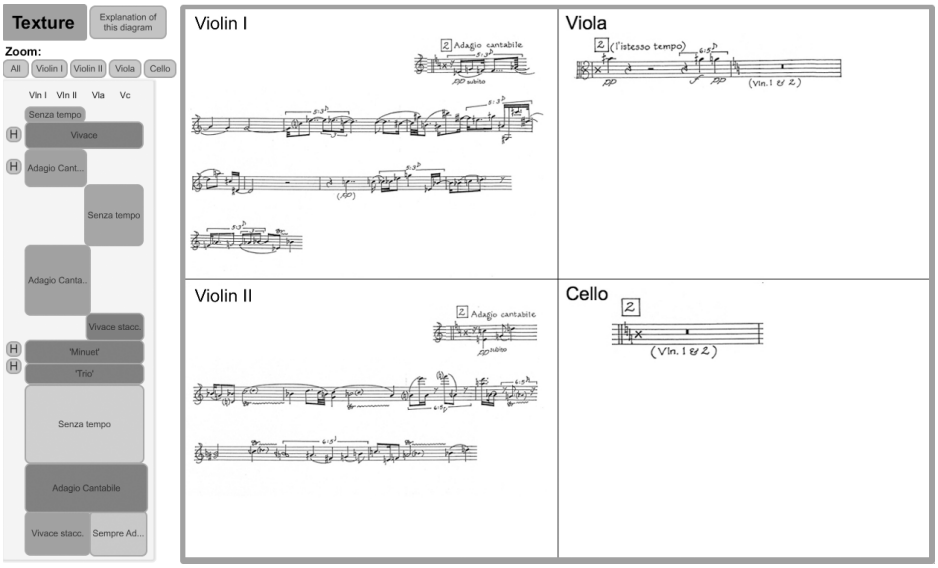

Figure 5: Texture and display of individual parts corresponding to selected section in left column.

15 See Bayley and Clarke, *Interactive Strategies*.

This diagram presents an overview of the relationship between sections of contrasting gestural styles and textures (based on a more detailed textural analysis; see Fig. 8). It serves two main purposes: firstly, as a reference tool to orientate the reader within the piece; and, secondly, to illustrate one of Finnissy's observations about the piece: »[T]he generalized archetype of a particular kind of material is not produced by thematic repetition. It's produced more by textural repetitions or gestural repetitions, rhythmic things perhaps.«[16]

What this representation of the piece does not define, however, are the varied transitions or different kinds of continuities between sections described above for which further analysis is required. Indeed, openness and extensibility are central to this approach. Practically, the programming language used (Max/MSP – a flexible object-oriented programming language commonly used in electroacoustic music) and the tree structure employed facilitate the extension of the software. Conceptually, the approach is one which views analysis of a work as an inexhaustible, multidimensional activity which will always be in development. For the present article the composer's working methods are further illustrated, through more detailed examples of both motivic and textural analysis, showing how the software can enhance such analysis.

Motivic analysis

Finnissy's method of transformation is revealed from the way he worked with the Haydn material:

> [...] the other thing that crept through from the Haydn quartet is that he writes very organically, so I did start thinking about treating the material. I guess the standard expression would be »develop it« but I prefer »explore it«. I did vary the material and work with it in a way which I suppose is closer to *organic* compositional process than it is collage pure and simple. There are [...] elements of both.[17]

This »organic« compositional process can best be seen in the Adagio sections of the piece which involve the combination and re-combination of motivic fragments originating from Haydn's Adagio of the string quartet op. 64,5. Finnissy's full »thematic«, metred statement of Haydn's first violin theme does not appear until the third Adagio, played by the viola at rehearsal number 24 (Fig. 6). This page can be accessed from the »rehearsal discussion« button alongside the third Adagio on the schematic diagram (Fig. 3). The user can hear how the players responded to the Haydn reference in rehearsal while viewing an alignment of the parts next to the Haydn score. As so often in this approach, the same material can be accessed from different places within the tree diagram. Figure 6 is also linked to the »Haydn« button on the tree diagram.

16 In interview with Bayley (8 May 2008).
17 Ibid.

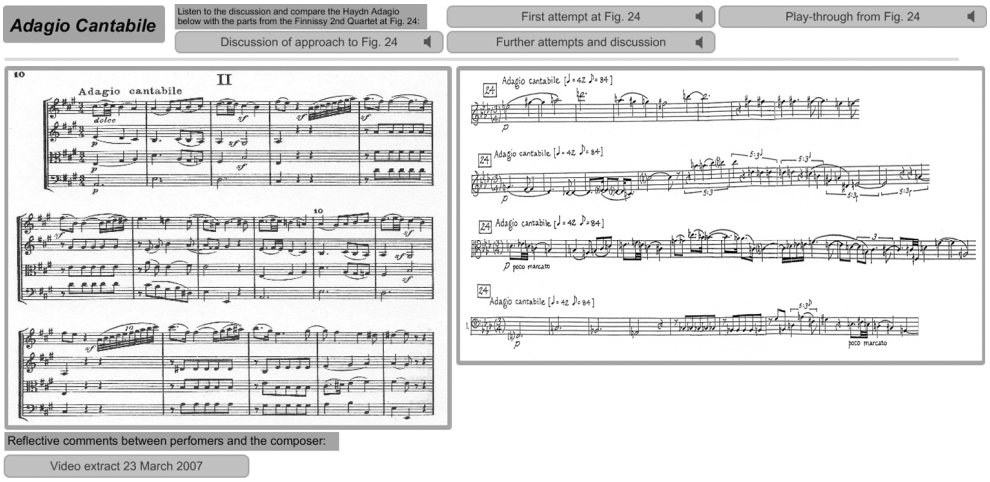

Figure 6: The beginning of Haydn's *Adagio cantabile* and Finnissy's third *Adagio cantabile* section (rehearsal number 24).

Finnissy arrives at this closest representation of Haydn's theme through the process of transforming fragmented elements of the motivic material in the first and second Adagios, at rehearsal numbers 2 and 4 (Fig. 7). The »motivic analysis« button of each of the Adagio sections on the schematic diagram (Fig. 3) displays the motivic connections between Finnissy's and Haydn's quartets.

Figure 7 identifies some of the motifs in the first and second violin parts of the first Adagio which have intervallic and rhythmic correspondences with Haydn's theme quoted by the viola in the third Adagio (Fig. 6). This page of the software also enables the user to make links with Haydn's Adagio: on the left-hand side of the screen, buttons allow the user to select one or more motifs. All the varied occurrences of the selected motifs are then highlighted on the page of the score in view, distinguished by colour-coding (colour plays a particularly important part in the highlighting of different motifs, represented here only with greyscale). A representative example of the motif is shown simultaneously in a separate small pop-up window. Clicking on this window opens a further window illustrating examples of the same motif (using the same colour-coding) in the Haydn quartet. The use of software in this way facilitates the exploration of multiple motivic relations across different parts of a work and between works.

At the bottom of Figure 7 the addition of audio extracts from an interview and from rehearsal discussions allows connections to be made to other elements on the tree diagram. There is obviously a limit to what can usefully be cross-referenced without overwhelming the user who is also encouraged to investigate those respective areas directly from the tree diagram (for example instrumental techniques such as trills, portamento etc., hidden by the overlapping window in the bottom right-hand corner of Figure 7). For this piece, the inclusion of interview extracts complements different analytical approaches. Here Finnissy elaborates on his working procedures by drawing analogies with film techniques:

It's [...] like film editing where you've seen a certain amount of stuff, then later bits of the film made of the same bits of film but cut up into smaller fragments and then just rejoined together in different ways so that the idea of recapitulation is re-enacted giving a scan across the material but not in a literal sort of way so that it's all reordered all the time: [...] a combination of [...] newly composed material and reminiscences of earlier parts of the piece in various sorts of transformation.[18]

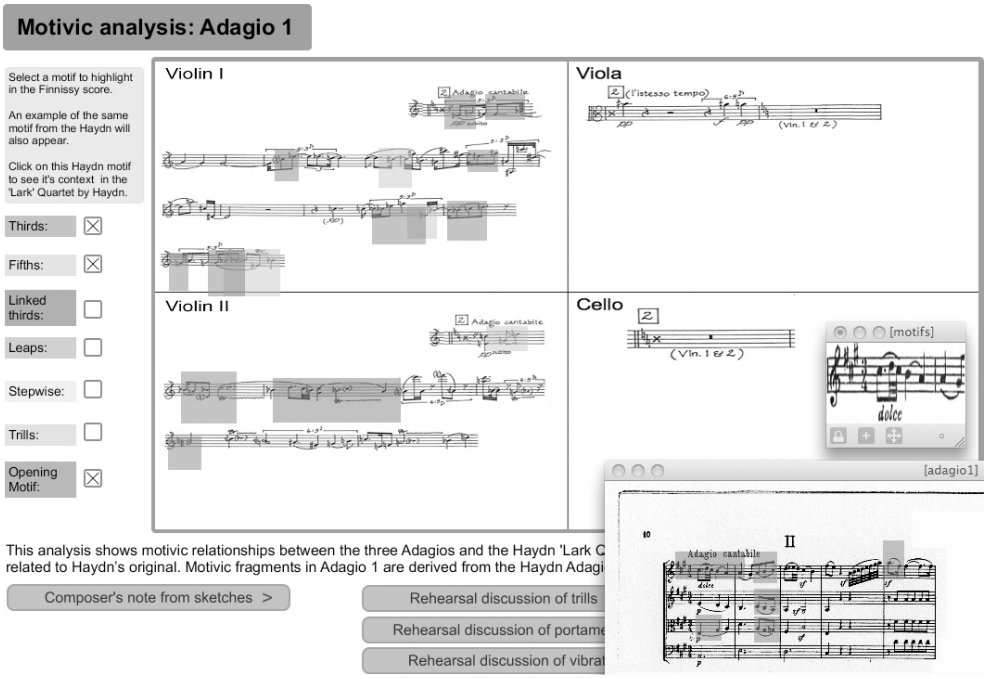

Figure 7: Motivic analysis of Finnissy's first *Adagio cantabile* (rehearsal number 2) highlighting motifs and linking them to the Haydn Quartet.

Textural analysis

The texture diagrams in Figures 5 and 8 show that texture does not always correspond to tempo; this is depicted by the different shadings (colours in the software) of the third Adagio compared with the first two. As defined by the key in Figure 8, the third Adagio (at rehearsal number 24) is homophonic, compared with the two-part counterpoint at rehearsal numbers 2 and 4 where the parts play independently of each other. Across the time-span of the piece, Finnissy's ordering and structuring of material defines the design of the Adagio sections which progress from an unmetred version (rehearsal number 2) to a metred version (rehearsal number 24). When questioned on this, Finnissy responded:

18 Ibid.

I always think of the material going on a journey of some sort. So, sometimes it's planned and sometimes it comes out of my work on the material. I don't necessarily plan that it's going to be that kind of journey from unmetred to metred but that would come as a result of working on the material and they nearly always go from a point to another point. I won't say start and finish because that would mean rhetorically there was a starting point and rhetorically there was a stopping point and I tend to wipe those off because I have this thing about music existing, compositions existing as part of a continuum, the beginning of which is a kind of illusion before the performance starts and the end happens after the audience have gone away. But nonetheless the material travels in the course of the piece so it's probably part of that kind of scheme.[19]

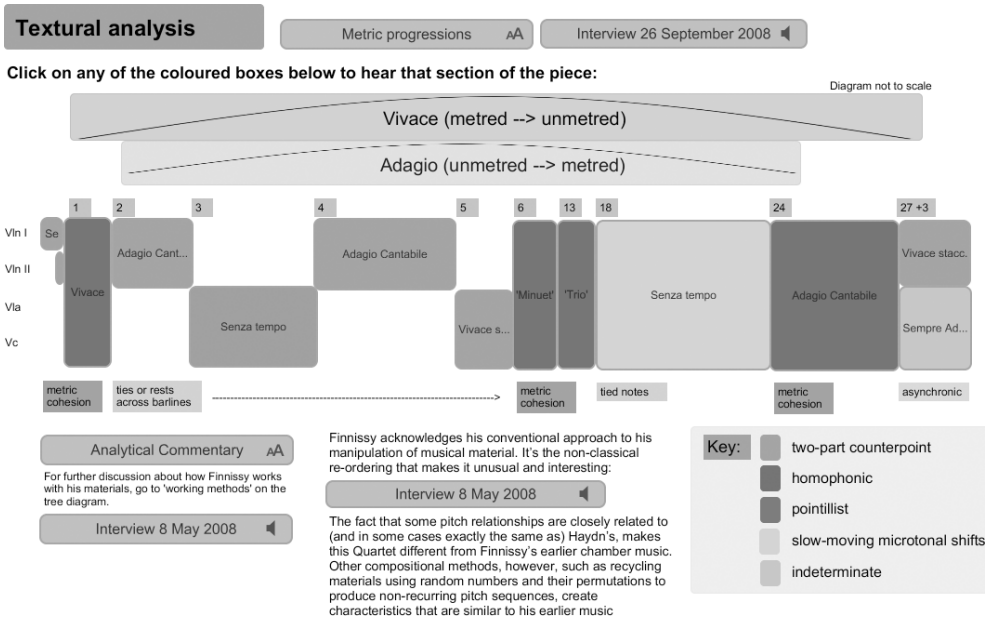

Figure 8: Textural analysis.

Counteracting this idea Finnissy was presented with the suggestion that the Vivace sections seem to do the opposite, starting metred and then moving towards being unmetred at rehearsal number 27 (also shown in Figure 8), to which he replied:

Well again if I noticed that was happening and made that kind of decision, that's certainly the kind of cross-over that I like to work with. It's quite rare that all the material types in a piece make the same journey. They probably make opposite ones more often than they do even similar ones. [...] There's a very basic impulse I have to set up, kinds of conflicts between materials which I can then resolve but in the resolution [I] set up another conflict which needs another resolution and so on.[20]

Figure 8 also identifies the relatively small portions of the piece that demonstrate metric cohesion (underneath the coloured blocks of texture). This diagram is not drawn to scale but timings taken from the first performance reveal that just under one third of the piece is metrically cohesive. Interview extracts on this page make

19 In interview with Bayley (26 September 2008).
20 Ibid.

reference to classical structures and to Haydn that provide the stimuli for these striking textural contrasts. In relation to the »Minuet« section discussed above, the »Interview with composer« button on Figure 4 reveals how Finnissy surprised himself with an aspect of the Haydn that he enjoyed working with:

> And that was the other thing I liked about the Haydn which I didn't know I would before I started writing it out [...] that actually I was quite happy writing that kind of notation, and I was enjoying hearing things coincide on barlines, which I don't normally. So there is an awful lot of rhythmic coincidence in the piece which I was having great fun with.[21]

In direct contrast with rhythmic coincidence are the *senza tempo* sections, which occupy substantial portions of the piece (approximately one third of the total playing time), and the indeterminate viola and cello parts in the last section (lasting almost another third of the playing time). As might be expected, the *senza tempo* instruction invites enquiry from the players. To listen to any sections of the piece during rehearsal the user is referred back to the schematic diagram.

Finnissy's explanations to the players in the rehearsal increase our understanding of texture and structure:

> There are two parallel things. Maybe they're not resolved... It has a point of contact with those neoclassical works of Schoenberg and Berg which do this too. They take the gestural frame of Classical music and put chromatic atonal pitches on the top.[22]

In addition to retaining the gestural frame of Classical music, Finnissy has also retained other gestural techniques, for example from Pierre Boulez. Finnissy's following explanations can be accessed via the »Boulez« button on the tree diagram (Fig. 9) or from the »rehearsal discussion« button at rehearsal figure 3 *Senza tempo* on the schematic diagram (Fig. 3). In rehearsal the composer's comments regarding Boulez were triggered by a question from Heyde: »The section from Figure 3 where you've got Morgan [viola player] and I... it's quite difficult to make it *feel* jumpy but you've written jumpy.«[23] (The composer's instruction in the parts is: »senza tempo: irregular and jumpy«.) Finnissy's response was:

> You could kind of exaggerate the spaces between the notes more. I don't expect it to be that literal so I think you can [...] play with the spacing a little bit. Actually the cello part is a retrograde inversion of the second section of Boulez' *Livre pour Quatuor* with the pitches of the Haydn second movement.[24]

When quizzed on this during a later interview Finnissy clarified that it was the texture of Boulez's quartet that attracted him to it. Pondering the Boulez score Finnissy commented on what he had taken from it:

21 In interview with Bayley (4 February 2007).
22 Extract from rehearsal 4 February 2007.
23 Ibid.
24 Ibid.

It's just a retrograde of the rhythms. They're not that literal... I think there are some adaptations: pizzicato, grace note...
I wanted to produce that rather sort of attenuated, nervy... it's also a bit satirical about [the] Darmstadt world, which was so different from Haydn. [...] Rather than evoke it in other ways, I literally took bits of the material. It's the very rapid alternation of things [...] that produces a kind of soundworld, although [...] it doesn't sound like Boulez. It's not supposed to sound like Boulez. It no more than momentarily has that sort of kaleidoscopic effect which is different from anything else in the music.[25]

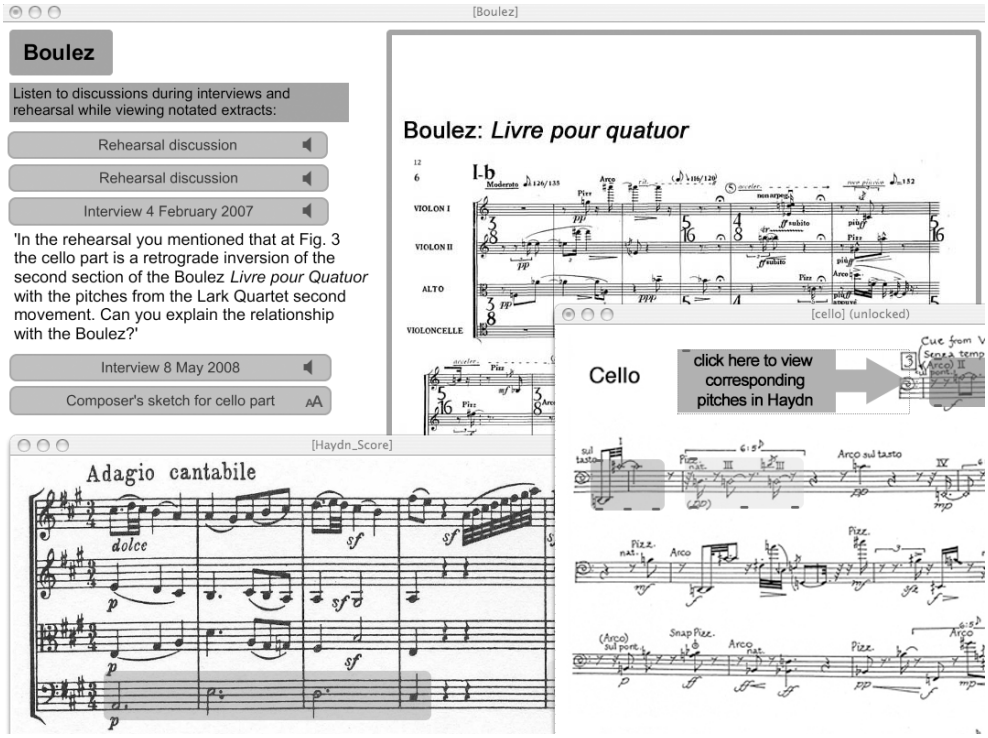

Figure 9: Pages from the »Boulez« button superposed.

The Boulez soundworld that Finnissy was trying to emulate can be seen from the extract from *Livre pour Quatuor* (Fig. 9). However, to further enhance the user's experience and to extend the inter-relationship between different sources, a recorded extract from *Livre pour Quatuor* (played by the Kreutzer Quartet) can be activated, and a link from the cello part brings up the Haydn connection identified by the composer. These examples show how questions and prompts from the players again led Finnissy to provide crucial insights to the piece and interpretative ideas for the players.

25 In interview with Bayley (8 May 2008).

Rhythmic and pitch permutations

Another way Finnissy transforms different types of material is through the permutation of pitch and rhythmic schemes as previously described in interview with Christopher Fox and Ian Pace in 1996:

> With self-generated material, sometimes I write pitch and rhythmic configurations separately, then combine the two to see what happens. You can always displace them and do something else if they don't work out and you still have the original material. It's a very exciting way to compose because everything becomes an adventure.[26]

Two pages from the sketches of the Second Quartet list a succession of different rhythmic patterns numbered from 1 to 30 and two pages list patterns of pitches. These are accessed from the »sketches« button on the tree diagram. Figure 10 shows extracts from these lists. The numbers in the top right-hand corner show that the composer crosses out each permutation once he has used it. In the Quartet Finnissy composes with these pitch and rhythmic fragments in the order dictated by a random list of numbers which, as explained in 1996, originates from the following source:

> I've got a print-out in book form, *Tables of Random Numbers* by Lincoln E. Moses and Robert V. Oakford, published in 1963... It consists of random permutations of limited numbers of digits: 1–9, 1–16, 1–20, 1–30, 1–50, 1–100, 1–500, 1–1000.[27]

The value of the sketch pages is augmented by the composer clarifying how he permutates these materials: »[W]hat I usually do [...] using the random numbers, I make a note of available territory then label the notes and then I'd make random orders of them.«[28] He refers to the lists of pitches in Figure 10 as:

> a reservoir of pitches which is used over and over, probably with very little variation although I might use some octave transpositions. This is really [...] like an extension of a kind of Grundgestalt technique or twelve-note technique in which the material has given some kind of schematic use of a limited reservoir [...], although it's very much wider than a note row because these don't duplicate the same patterns. But they nonetheless appear in all the parts as material, from time to time. So they do notionally [...] confer some kind of unity on the material.[29]

Within the software, links between the sketches and the score show how and where Finnissy uses some of these permutations. Whether referring to pitch or rhythmic material Finnissy explains: »it's simply a way of producing variations of the material with random orderings of the constituent elements so that the players don't have them again in the same pattern«.[30] Also appearing within the »sketches« button and accommodated under the »notation« button of the tree diagram, are the composer's written instructions regarding the interpretation of his rhythmic notation. These are

26 Fox / Pace, *Conversations with Michael Finnissy*, p. 40.
27 Ibid.
28 In interview with Bayley (8 May 2008).
29 Ibid.
30 Ibid.

only written in the sketches and not in the individual parts. Finnissy knew he would be working with the players so did not think it necessary to include the instructions in their parts. However, such information is obviously valuable to future performers of the piece. As all the above examples show, the potential for linking and interrelating the layers of material from each stage of the compositional, interpretative and subsequent analytical processes is endless.

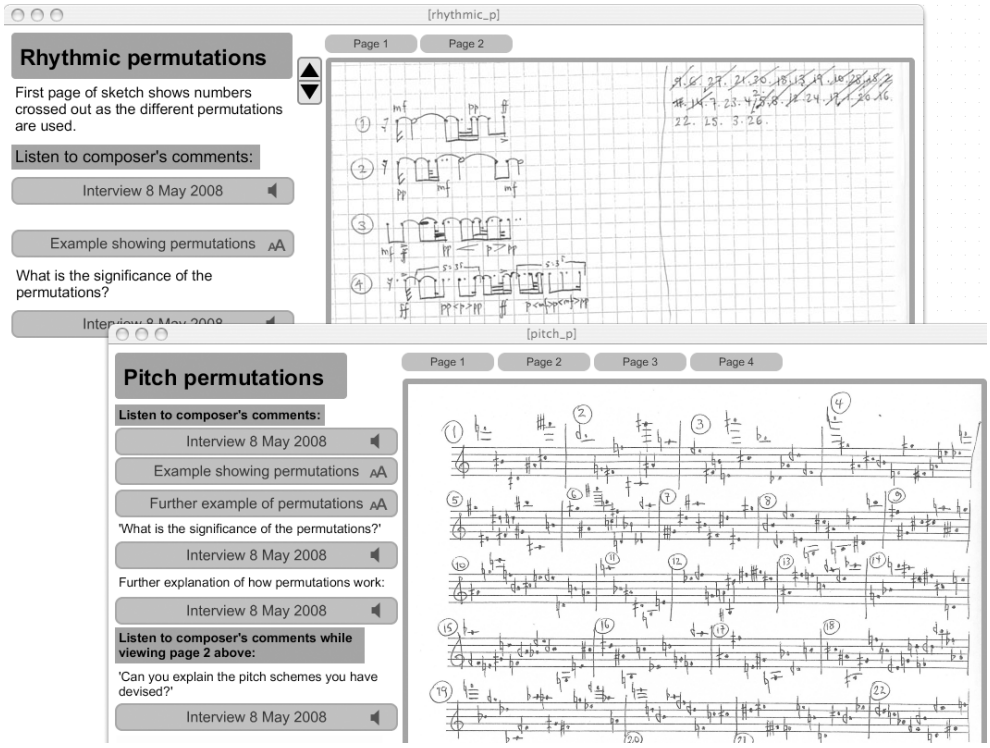

Figure 10: Rhythmic and pitch fragments from Finnissy's sketches.

Conclusion

Traditionally, analysis of Western Classical music has made reference primarily, if not exclusively, to the score. Results of analysis have been presented as a linear written text, illustrated by music examples and charts. The aural, transient and dynamic is thereby changed into something visual, fixed and static. But music and analysis have changed. Much contemporary music no longer has fixed definitive scores with unchanging vertical alignment and analysis, too, is developing, taking into account performance practice and materials other than the score, some of which cannot be transcribed into written text without loss. Recent developments in music technology can provide many useful resources through interdisciplinary collaborations. It is possible to combine multimedia materials such as text, audio and video so that different interpretations of a work can be compared and interviews with com-

posers and performers integrated into an analysis. Even so traditional a practice as motivic analysis can be presented in a new way using software to facilitate the exploration of multiple motivic relations within and between works. Although programming skills are needed, it is relatively easy to develop and extend such software using modern graphic programming languages. Perhaps just as significantly, an analysis no longer has to be a fixed linear exposition: it can be presented as a rich open network of materials and interpretations, inviting exploration and discovery from composers, performers and musicologists alike.

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